



# Prototyping – Fostering Partnerships for Innovation

**Dr. Chuck Perkins**

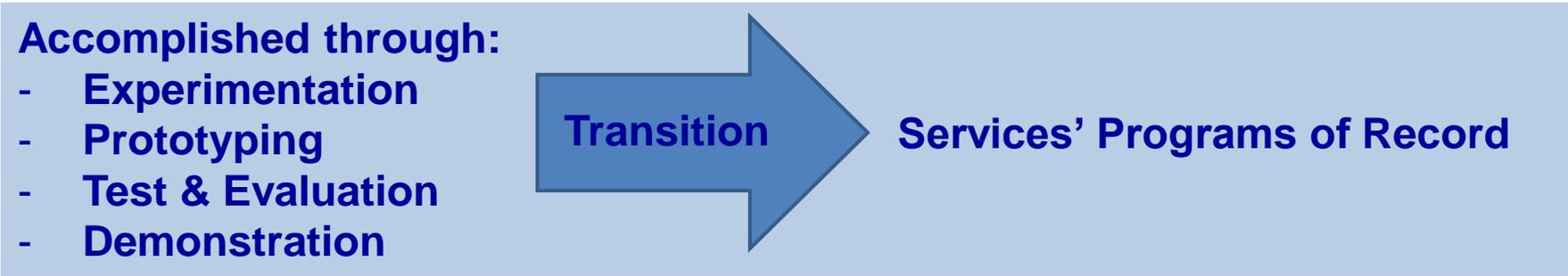
**Acting Deputy Assistant Secretary of Defense  
(Emerging Capability & Prototyping)**



# Emerging Capability & Prototyping (EC&P)



**Mission: identify, develop and demonstrate multi-domain concepts and technologies to satisfy DoD, Multi-service and CCMD priorities.**

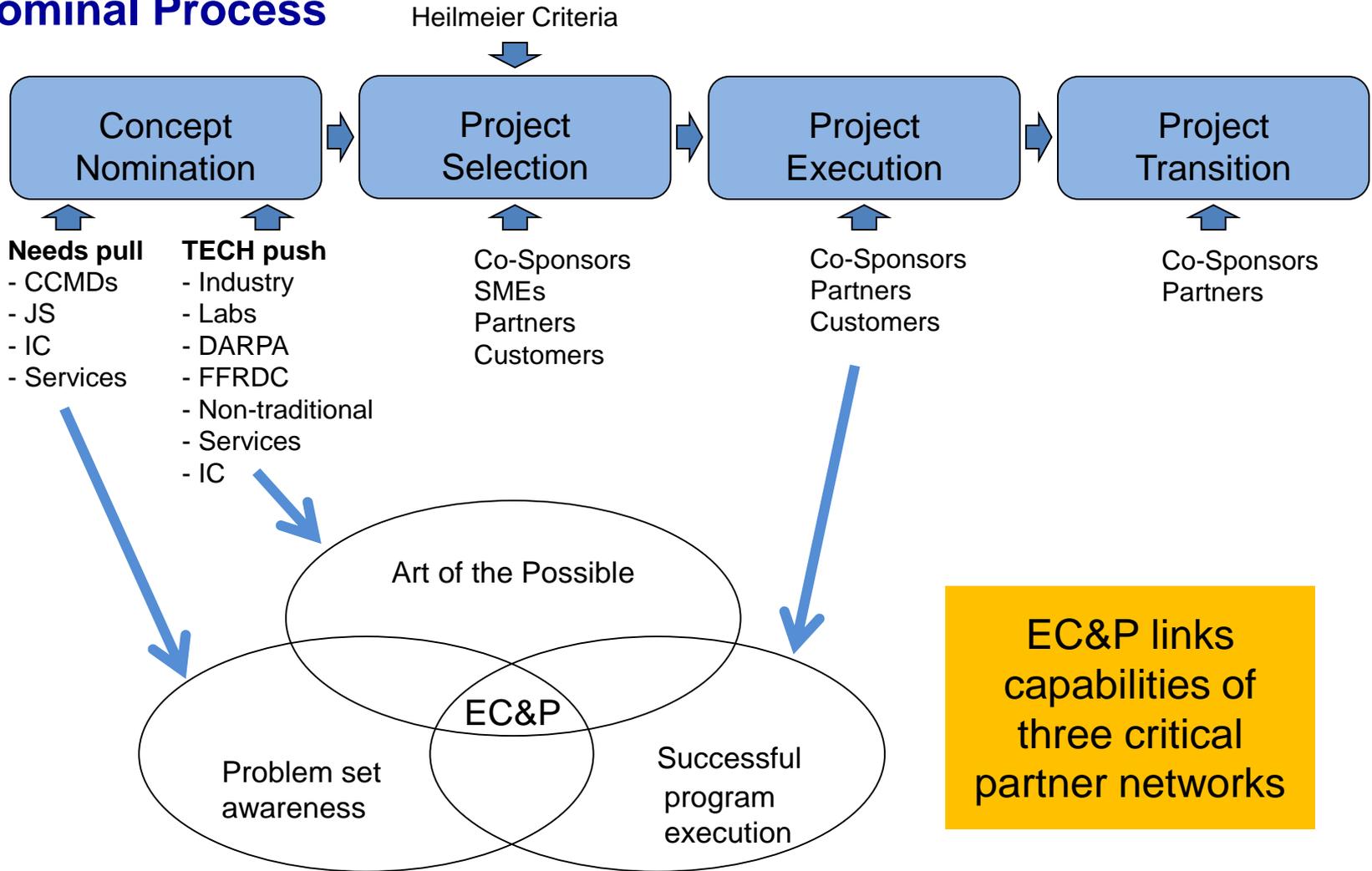


**Incubator for war-winning capabilities enabled by cutting-edge technologies**



# EC&P's Critical Network of Partners

## Nominal Process



EC&P links capabilities of three critical partner networks



# Emerging Capability & Prototyping



- Identifies, develops, and demonstrates multi-domain technologies and concepts to satisfy DoD, Multi-Service, and CCMD priorities
- Operationalizes leading edge technologies and leverages the entire R&E enterprise for sources of innovation
- Partners with joint, interagency and international players
- Incentivizes innovation through prototyping and experimentation
- Broadens the supplier base to include non-traditional domestic & international performers
- Program elements (JCTD, ECTD, QRSP, FCT and RIF) are congressionally supported
- With CIO, shapes investment of Spectrum Relocation Funds

“Seams, cracks and fissures”



# Joint Capability Technology Demonstration (JCTD)



Execute prototypes and experiments to address DoD strategic needs, fill operational gaps and reduce technical risk

Anti-jam Precision Guided Munition (AJPGM)



Autonomous Mobility Applique System (AMAS)

Joint Multi-platform Advanced Combat ID (JMAC)



## Joint Capability Technology Demonstration (JCTD)

- Foster innovation, contribute to accelerated acquisition and weapon system affordability while providing the Joint Forces with a decisive technical advantage
- Fieldable Prototypes/Demonstrations; < 48 months, < \$100M
- POC: Mr. Elmer Roman



# Joint Multi-platform Advanced Combat ID (JMAC)



FY14

JMAC will provide government-owned software that can be integrated into any sensor or Command and Control (C2) system to provide real-time identification of air threats, including Unmanned Aerial Systems (UAS), cruise missiles, rotary wing, military jets, and general aviation.

**Partners:** NORAD-USNORTHCOM, DHS, MIT-LL, U.S. Army AMRDEC, U.S. Army CMDS, SMDC, AFRL, JIAMD0

### Outcome:

- JMAC will be integrated into the NCR-Integrated Air Defense System (NCR-IADS) Program Office
- Upgrades to the Improved-Sentinel radar, Enhanced Regional Situational Awareness (ERSA), and the Joint Air Defense Operations Center (JADOC) will occur in 2017
- JMAC will substantially improve the identification of non-cooperative targets much earlier in the kill-chain, which will increase decision space for senior leaders and increase available engagement distance between threats and defended assets/critical infrastructure



Enhanced combat ID for faster response time in NCR-IADS



ERSA at the NCR



Sentinel radar



Threat set



# Emerging Capabilities Technology Development (ECTD)



## Explore art of the possible

Infrared Motion Detection (IrMD) Using Existing EO/IR Assets



Long Range Engagement Weapon (LREW)

Remote Weapon System Auto Prioritization, Targeting, and Operator Cueing (RAPTOR)



## Emerging Capabilities Technology Development (ECTD)

- Pursue risk-reducing technology prototypes and demonstrations of cutting edge land, sea, air and space systems for the joint Warfighter
- Proof-of-Principle prototypes; < 36 months, < \$6M
- POC: Mr. Jon Lazar



# Remote Weapon System Auto Prioritization, Targeting, and Operator Cueing (RAPTOR)



## Provided the ability to quickly respond to hostile fire

- Combines automated target detection, tracking, and target prioritization to queue targets and prompt warfighter response
- Tracks multiple threats to reduce engagement time for subsequent targets

## Transitions to the Joint Advanced Weapon Sensor System (JAWSS)

### Partners

- Army Armament Research, Development, and Engineering Center (ARDEC)
- Naval Surface Warfare Center (NSWC) Dahlgren
- Office of Naval Research
- Space and Naval Warfare Command
- United States Marine Corps Warfighting Laboratory
- Penn State University
- York University
- University of Manitoba
- Southwest Research Institute
- Other industry partners



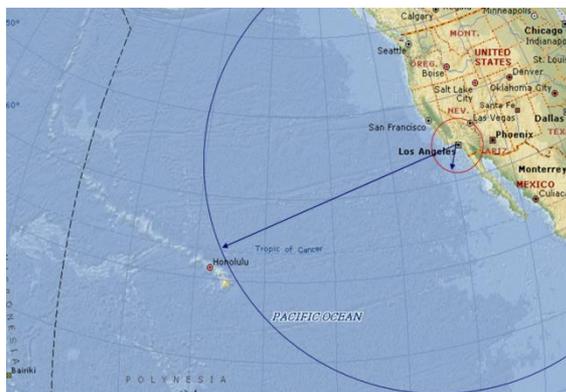
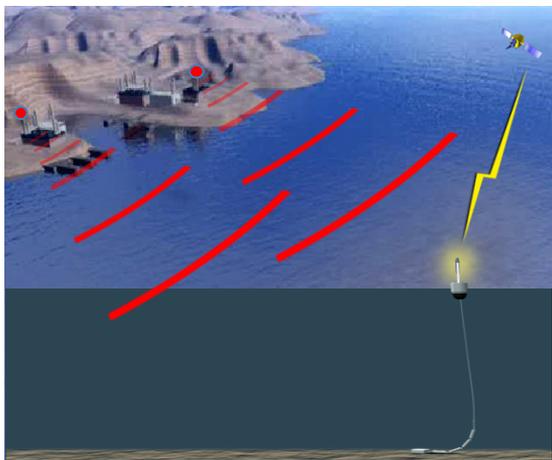


# Quick Reaction Special Projects (QRSP)



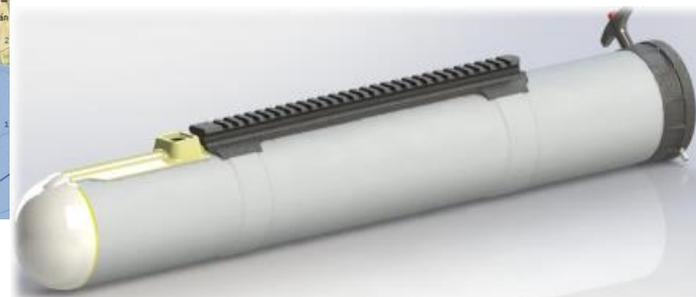
Offer rapid response to emerging capability shortfalls

Bloom



Aluminum-Seawater Fuel Cell Start System

UAV Payload Dispenser



## Quick Reaction Special Projects (QRSP)

- Mature emerging technologies for operational use by the joint Warfighter
- QRF – Conventional warfare needs focusing on A2/AD; < 12 months, < \$3M
- RRF – Irregular warfare needs with global focus; < 18 months, < \$1M
- POC: Mr. Jon Lazar



# UAV Payload Dispenser



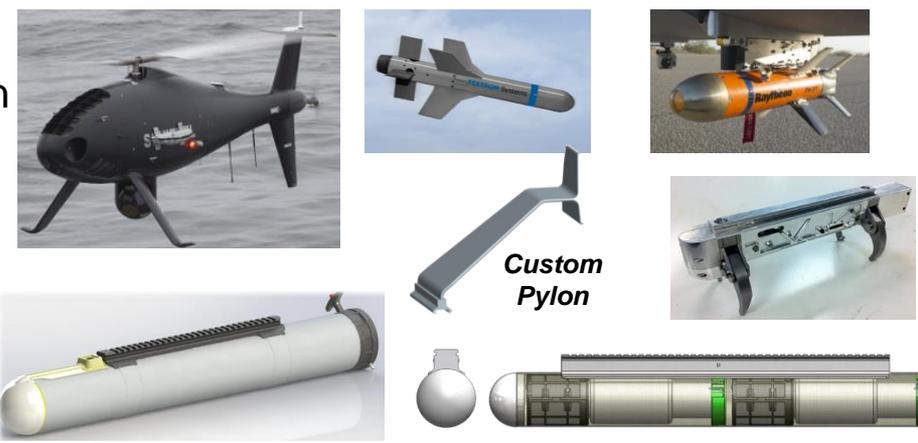
## Common Interfaces and Battle Management System (BMS) for Small UAVs

- Combines common launch tube, Picatinny Rail, and GOTS Mini-Battle Management System (BMS)
- Designed for a variety of weapon systems including Textron Fury, Raytheon Pyros, and General Dynamics 81mm mortar weapons

**Accurately deliver specialized payloads into remote or otherwise difficult to reach environments**

## Partners

- Naval Innovative Science and Engineering
- Special Operations Command
- Naval Surface Warfare Center Dahlgren
- Marine Corps
- Raytheon
- Textron
- ATK
- General Dynamics





# Foreign Comparative Test (FCT)



Authorized to leverage international allies' and partners' R&D investments

Pilot Physiological Monitoring and Warning System (Israel)

Pilot Oxygen/Blood Flow Sensors



Soldier-Sniper Weapon Observation Reconnaissance Device (Canada)

Secondary Propulsion Thrusters (Germany)



New Pump Jet Technology

## Foreign Comparative Test (FCT)

- Evaluate foreign prototype technology to adapt / transition for DoD use
- Pre-EMD prototype and non-development item demonstrations; < 24 months, < \$2.5M
- POC: Col Sean Bradley



# Secondary Propulsion Thrusters

**Offers variable speed control and directional thrust for greater ship control**

**Provides life cycle cost savings through :**

- Reduced manning and maintenance requirements
- Elimination of support cost such as tug fees accrued during mooring evolutions

## Benefits

- Meet existing SPS requirements for emergency thrust
- Improved low speed maneuvering
- Improved surface turning radius
- Improved repair/replacement approach
- On demand thrust with no time delay
- No platform speed limitations
- Immediate response and control

## Participants

- Sponsors: NAVSEA SBIR Program and Program Offices (SEA 073, PMS 450 & 397)
- Gov't Contributors: SEA 05Z, SUBMEPP
- Industry: Schottel (Germany), Progeny (US), GDEB



Legacy Secondary Propulsion System (SPS)



New Pump Jet Thruster Technology

**Potential to Significantly Reduce Total Ownership Cost**



# Rapid Innovation Fund (RIF)



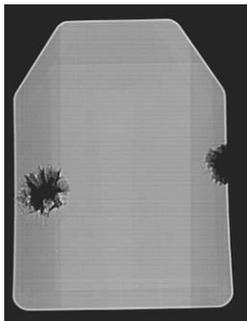
## Explore art of the possible

## Aid technology integration

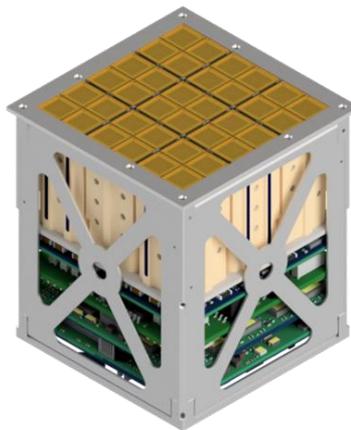
### Encapsulated Body Armor



w/o Encapsulation

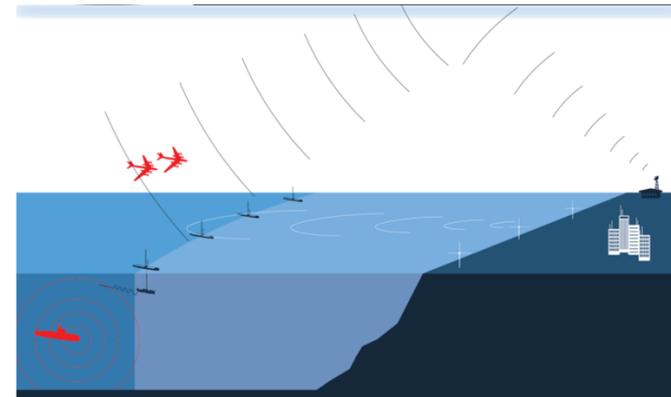


with Encapsulation



### TILE Satellite Electric Propulsion System

### Long-Standoff Maritime Sensor Network



## Rapid Innovation Fund (RIF) ~ \$250M/year

- Accelerate the fielding of innovative technologies into military systems pursuant to Small Business Innovative Research projects, technologies developed by the DoD labs, and other innovative technologies
- RIF Partners: Services, COMCOMS, Defense Agencies
- Award preference to small businesses: < 24 months, < \$3M
- POC: Mrs. Ellen Purdy



# SILVERTIP: Sensor Network for Maritime Early Warning (NORTHCOM)



## A Mobile Sensor System for the Detection and Tracking of Surface, Subsurface, and Airborne Targets

Low-Cost, Unmanned, and Environmentally Friendly  
Proven Performance in the Arctic

## Multiple Transition Programs Being Explored

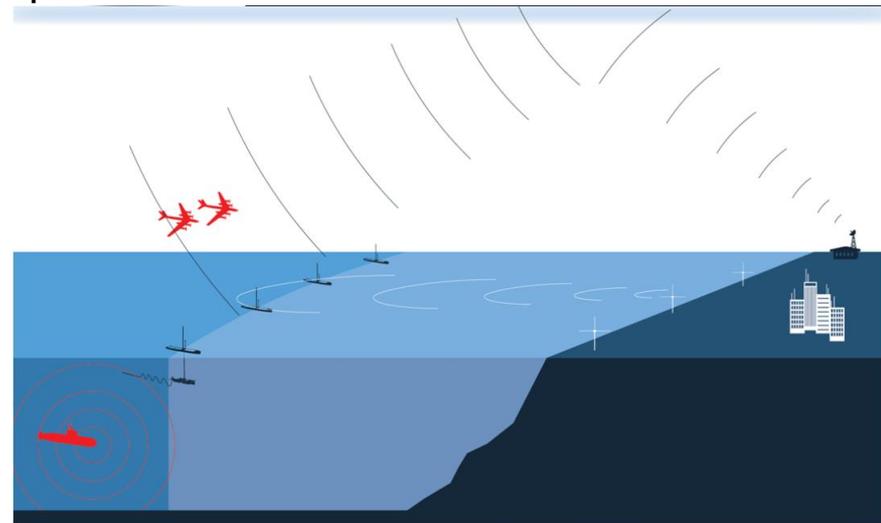
USAF (OTH-B), USN (ROTHR), DHS (CSS)  
Final Transition Plan to be Formalized in Full Proposal

## Partners

USNORTHCOM  
SPAWAR Systems Center Pacific  
Liquid Robotics, Inc. – Prime  
The Boeing Company – Acoustic Processing  
ArgonST – HF Radar Processing

### Related Prior or Current Work:

SHARC as an Off-Board ASW Sensor (IR&D)  
MAYFLOWER (IR&D)  
Multiple-Vehicle Collaborative Autonomy (SBIR)





# Characteristics of EC&P Projects



- Projects span all Joint Capability Areas
- Projects inform requirements development
- Most projects have co-sponsors
- Projects emphasize user involvement with technology demonstration and experimentation
- Transition planning from the start
- Most projects provide residual capabilities
- Partnerships are critical to success

“Seams, cracks and fissures”



# 2018 Areas of Concentration



## **Asymmetric Force Application**

The use of nontraditional technologies, tactics, logistics enablers, and asymmetric approaches (e.g. autonomous/intelligent systems, human-machine combat teaming, low cost autonomous assets, and disaggregated weapons systems) to provide a clear military advantage to our forces during maneuver and engagement operations.

## **Electromagnetic Spectrum Maneuver (EMSM)**

The use of capabilities and technologies to maneuver freely in the EMS for offensive and defensive operations in multiple domains. Maneuverability requires gaining and maintaining access to spectrum, denying and/or degrading spectrum to our adversaries, and conducting EMS deception operations. Intelligent systems and novel computational architectures and approaches will accelerate and automate time critical decision making to enable optimized and resilient exploitation of the EMS.

## **ISR and Counter-ISR**

Technologies to enhance the resiliency, reach, and flexibility of ISR systems through low-cost manufacturing, attritable systems, autonomy, cooperation at scale, on-board processing, and improved sensors.

## **Information Operations and Analytics (IO&A)**

Efficiently and accurately exploit information collection and analytics technologies for seamless Processing, Exploitation, and Dissemination (PED) of all-source data and information as well as multi-domain Command and Control across Services, Combatant Commands, and Partner Forces.



# Questions...

**Contact: [charles.w.perkins.civ@mail.mil](mailto:charles.w.perkins.civ@mail.mil)**



# Back-up chart



# Heilmeier Criteria



- **What are you trying to do? Articulate your objectives using absolutely no jargon.**
- **How is it done today, and what are the limits of current practice?**
- **What is new in your approach and why do you think it will be successful?**
- **Who cares? If you succeed, what difference will it make?**
- **What are the risks?**
- **How much will it cost?**
- **How long will it take?**
- **What are the mid-term and final “exams” to check for success?**

**-- George H. Heilmeier, Director of DARPA (1975-1977)**